Space Weather Forecast

Issued on Tuesday, 26 September 2023 at 01:08 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Isolated Moderate flares likely, with a slight chance of Strong flares (R1-R3 Radio blackouts). Chance of G1-G2 minor/moderate geomagnetic storms Days 1 and 2 (26 Sep).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low activity, with a long period Common-class flare observed at 25/0813UTC from a sunspot region in the southeast of the disc. There are currently ten sunspot regions on the Earth-facing disc. The aforementioned sunspot region was the most active and developmental region on the disc, continuing to show complexity in its configuration. Other regions in the northwest and west-centre disc have persisted as moderately sized regions, and continue to show some complexity and activity. A region in the southeast has been quick to form and has already seen some activity, so this will continue to be monitored. The newly numbered region is rotating around the northeastern limb. A number of eruptions were observed over the western limb, but are considered to be far-sided with no significant Earth component. No other Earth-directed coronal mass ejections (CME) have been observed in the past 24hrs.

Solar Wind / Geomagnetic Activity: Solar winds have been at mostly slightly elevated levels throughout much of the period, due to the effects of a CME which arrived at Earth on the UTC evening of 24 September. Speeds have ranged between 420-500km/s. The Interplanetary magnetic field strength (IMF), Bt, has been strong or very strong throughout, with a gradual declining trend. The north-south component (Bz) was negatively strong, before increasing to become positively strong or very strong, with a gradual declining trend towards moderate levels. Resultant geomagnetic activity was G1/Minor Storm (Kp 5) between 25/0000-0600UTC, with activity reducing to Active/Unsettled (Kp 3-4) from 25/0600UTC, and is currently at Quiet levels (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background to moderate levels, with no Solar Radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is forecast with further isolated Moderate flares likely. There is also a slight chance of rising to High due to the potential for isolated Strong flares from the sunspot region in the south.

Solar Wind / Geomagnetic Activity: Further CME arrivals are possible into Day 1 (26 Sep). Confidence is low however, with glancing impacts most likely. Solar winds are likely to remain at slightly elevated levels early on Day 1 (26 Sep) reducing to slow-ambient levels, with the absence of any further CME arrivals. Geomagnetic activity will be mostly Quiet to Unsettled (Kp2-3), with a slight chance of Active (Kp 4) to G1-G2/Minor-Moderate Storm (Kp 5) on Day 1 (26 Sep) should any subsequent glancing CMEs occur. Quiet to Unsettled (Kp1-3) activity is then expected to dominate from Day 2 (27 Sep).

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Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at moderate to background with no Solar Radiation storms occurring.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	30	20	10	20
Strong	G3	No	5	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	20	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	15	15
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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